ART. XVII.—*On certain Peculiarities in the Construction of the Orbit.*

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THE following observations were incidentally made while I was engaged in examining crania for other purposes. They are in one sense, therefore, original. But, as every one knows, the almost exhaustive study devoted to descriptive human osteology, it is doubtful whether anything of importance can be added to the record. Subsequent examination of its literature served to confirm me, in many instances, in this probability, as well as to direct my attention to several features of orbital mechanism that had escaped me. While my facts may be old it does not follow that they are familiar. On the contrary, they are seldom if ever mentioned in text-books. The original memoirs containing their descriptions are found in journals devoted for the most part to purely scientific matter, and which, as a rule, are not accessible to the student. An attempt to bring this scattered material together in something of a connected form, is all that is claimed for this communication.

The bones of the skull may present many peculiarities with respect to their manner of articulation. I have in other places mentioned certain of these which had come under my notice, such as the method of union between temporal and frontal—parietal and sphenoid bones,[1] as well as the great differences which obtain between the shapes of the lower jaw, not only in different persons, but upon opposite sides of the same person.[2]

I now propose to notice the different methods after which the orbit may be fashioned; the floor being omitted as not presenting peculiarities of interest. As may be surmised, standard descriptions will not be widely departed from.

When an author's name appended to a statement is printed in italics, it signifies that I have not met with examples of the kind.

A. *Roof of Orbit.*—Instead of being formed entirely by the orbital plate of the frontal it may possess in addition a thin plate derivable, most probably, from the greater wing of the sphenoid.—(*Czermak*,[3] *Hyrtl.*[4])

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[1] Remarks on the Conformation of the Mammalian Skull. Proc. Acad. Nat. Sci., Philad., vol. 18, 1867, 11.

[2] The Jaw of Moulin-Quignon.—Dental Cosmos, vol. ix. 169.

[3] Czermak, Joh. Ueber einen eigenthümlichen Shaltknochen im Augenhöhlendache des Menschen. Siebold u. Kölliker's Zeitschrift, III., 1851, 27. (Taf. 2.) Six cases recorded, all in young people.

[4] Hyrtl, Jos. Ueber wahre und falsche Schaltknochen in der *Pars Orbitaria* des Stirnbeines. Sitzungberichte der K. Akad. der Wissenschaften Wien, XLII., 1860, 213. (Taf. 1, 2, 3.) Gives twenty-five examples of the first. He defines the second (false bones) to be small isolated portions of the orbital plate of greater wing of sphenoid appearing upon the roof of the orbit, at or near the line of its articulation with frontal, entirely surrounded by the orbital plate of the latter.

B. *Outer Wall of the Orbit.*—(*a.*) Usually defined by the union between greater wing of sphenoid, external angular process of frontal and orbital process of malar bone it may show absence of articulation wholly or in part between the anterior portion of greater wing of sphenoid and malar bone. (Hyrtl.)[1] This—a normal appearance in crania of most mammals—appears sufficiently often in the skull of the aged to make it one of the most constant features of senility.

(*h.*) The spheno-maxillary fissure, normally formed by the space included between malar, superior maxillary, and palate bones, and greater wings of sphenoid, may be without the malar, in consequence of the sphenoidal quantity uniting with the superior maxillary. (Gruber.[2]) Holden[3] mentions having seen this peculiarity. He apparently was not acquainted with Gruber's memoir.

C. *Inner Wall of Orbit.*—Usually composed of the sphenoid, os planum of ethmoid, and lachrymal bones,—it may conform to the following variations :—

(*a.*) A descending portion of frontal bone may intervene wholly or in part between sphenoid and ethmoid, or a process from the palatal may ascend to articulate with the frontal process, or may join the frontal directly. (Gruber.)[4] These changes were most conspicuous in two skulls of idiots—one in Prof. Jos. Pancoast's collection, the other in the Wistar and Horner Museum.

Fig. 1.

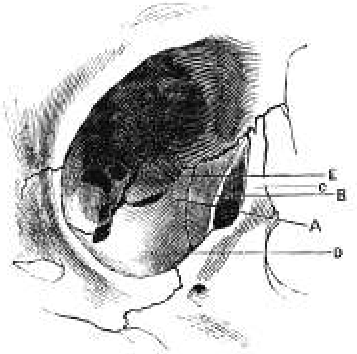
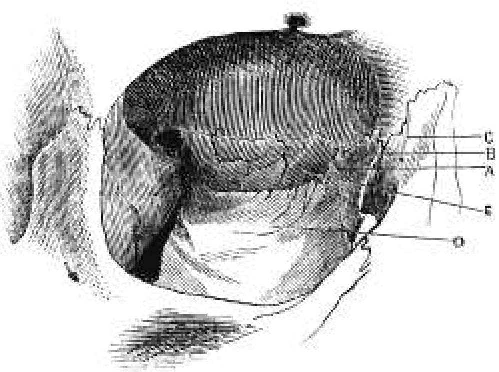


Fig. 2.



A. Process of superior maxilla. B. Lachrymal bone. C. Nasal process of superior maxilla. D. Orbital plate of superior maxilla. E. Os planum.

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[1] Hyrtl. Handbuch der Topograph. Anatomie, 1865, 20.

[2] Gruber W. Abhandlungen aus der Menschlichen und Vergleichenden Anatomie, St. Petersburg, 1852, 116.

[3] Holden. Human Osteology. London, 1855, 82.

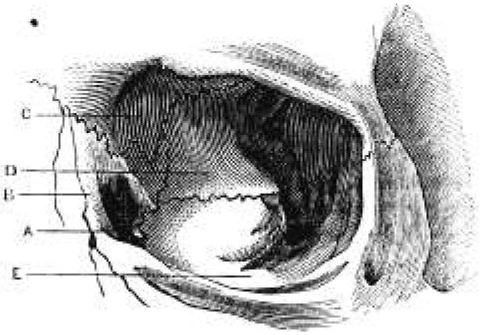
[4] (Ibid.)

(*b.*) A descending process of the frontal may reach the orbital plate of superior maxillary bone, at floor of orbit, or may more rarely meet with ascending process from the last-named bone. (Gruber.)

In Fig. 1[1] it will be seen that the lachrymal bone is completely separated from the ethmoid (which is divided into several irregular areas) by an ascending process from the orbital plate of the superior maxilla. A similar arrangement is seen in Fig. 2.[2]

(*c.*) Lachrymal bone may be reduced to a rudiment, see Fig. 3. Specimen from Wistar and Horner Museum.

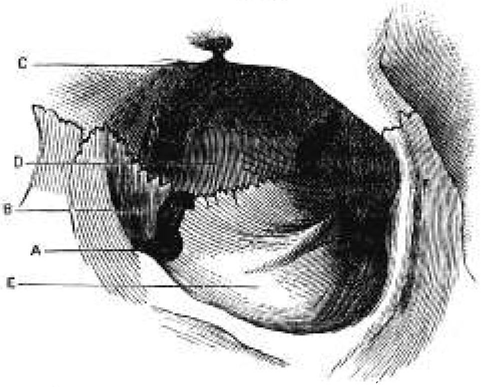
Fig. 3.



A. Rudiments of lachrymal bone. B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

(*d.*) Lachrymal bone may be absent; a small irregular space indicating the position it should occupy, see Fig. 4. W. and H. Museum (261).

Fig. 4.



A Osseous interspace indicating the position for lachrymal bone. B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

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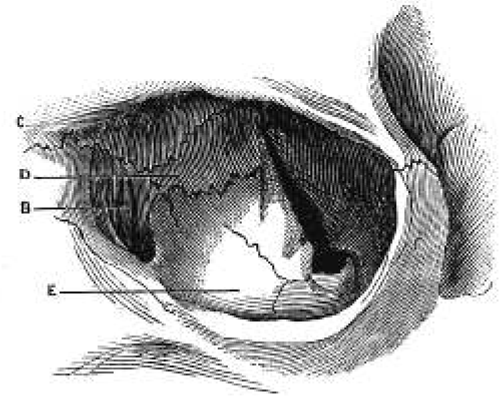
[1] From a skull of a young chimpanzee. Museum Acad. Nat. Sci.

[2] From a skull of Esquimaux, aged 11 years. Morton Cab. Acad. Nat. Sci.

It is quite probable that in this example an isolated rudiment of the lachrymal had existed during life. This absence with indicated space should not be confounded with the absorption of the bone in old age. See Hyrtl, Anatomie. (*Supra.*)

(*e.*) Lachrymal bone may be absent, no interspace (Gruber,[1] Meckel[2]), see Fig. 5. Wistar and Horner Museum (39).

Fig. 5.



B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

(*f.*) An accessory lachrymal bone may be found lying between the lachrymal proper and nasal process of superior maxilla. (*Luschka.*[3])

(*g.*) A small ossicle may be seen at the anterior inferior region of inner wall of orbit wedged between the nasal process of superior maxillary, lachrymal, and malar bones. (*Rousseau,*[4] *Gruber.*[5])

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[1] Gruber, W., Seltene Beobachtungen aus dem Gebiete der Menschlichen. Anatomie. Müller Archiv. xv. 1848, 412 (Taf. xiv.).

[2] Meckel, Path. Anat. I. 345.

[3] Luschka, H., Das Nebenthränenbein des Menschen. Müller's Archiv. 1858, 304 (Taf. xi.). Twelve cases observed; three figured.

[4] Rousseau, E., Description d'un nouvel os de la face chez l'homme. Annales des Sci. Naturelles, xvii. 1829, 86 (Pl. 5, A. Figs. 1—3). Six cases observed.

[5] Gruber, W., Bulletin Physico-Mathematique de l'Académie des Sciences de Petersbourg, viii. 1850.